

# Black Bear Population Analyses 2003

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## **Abstract**

Bear visitation rates averaged 54% for 18 bait station surveys conducted in the primary range (Zones A, A1, and B), and 37% for 6 surveys conducted in the peripheral range (Zone C).

The population model produced a statewide estimate of approximately 11,150 bears in Fall, 2003. Bear populations now appear to be slightly below goals in all Bear Management Zones except for Zone A1 where it is approximately 15% above our goal. A harvest of 2,380 bears was recommended for the 2003 season.

## **Methods**

Bear bait station surveys were conducted by wildlife management and research personnel in the 18 counties comprising the primary bear range and 6 counties within the peripheral range in 2003. The surveys were run between 15 June and 15 July, and consisted of 50 bait stations placed at 0.5-mile intervals along driveable roads. A plastic mesh overwrap bag filled with approximately 2 lb of fresh meat was securely wired to a tree about 7 ft above the ground at each bait station. Bait stations were checked for bear visitations after 7 nights.

A station was considered to have been visited by bears if the bag of meat was gone and the wire securing it had been stretched or broken, or by marks on the trees and/or trails leading to the station. Bait stations were considered inoperable and not included in the calculations if they could not be found or if the bait had been taken by animals other than bears.

Three-year running average visitation rates ( $[\text{year} \times 2 + \text{year}^{+1}]/3$  for first year;  $[\text{year}^{-1} + \text{year} \times 2]/3$  for last year, and  $[\text{year}^{-1} + \text{year} + \text{year}^{+1}]/3$  for all other years) were used as an independent index to bear population trends within Zones A, A1, and B. Combining years reduced annual fluctuations resulting from rather small sample sizes and large annual changes in the abundance of natural foods.

All bears legally harvested were registered at DNR or cooperative stations. A lower first premolar was collected as the bears were registered, and the sex and county of kill were recorded for each bear. Registration personnel were provided instructions and envelopes for storing the teeth. Teeth were sent to the Matson's Lab in Milltown, MT for processing, and ages were assigned by counting annuli in the cementum.

Wisconsin's Bear Population Model was adapted from the one developed and used in Minnesota. That model was updated in 2002 to include the most recent bear harvest, age, and bait station data, and used to estimate bear populations in each Bear Management Zone (Figure 1).

U.S. Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services (WS) personnel took over Wisconsin's bear damage/nuisance abatement work in 1990 (Engstrom and Kohn 2000). Beginning in 1995, WS personnel chemically immobilized and ear-tagged most bears captured  $\geq 30$  days prior to the bear hunting season. Bears captured within 30 days of the bear hunting season could not be chemically immobilized due to human health regulations. Numbers of ear-tagged bears handled each year by WS and numbers of those shot that same year were used to calculate another estimate of the adult bear population using

procedures described by Chapman (1951) and Seber (1982). These estimates were compared to those estimated by our population model.

## **Results**

Bear visitation rates in the 2003 Bear Bait Station Survey averaged 65% in Zone A, 56% in Zone A1, 44% in Zone B, and 54% in the primary bear range (Zones A, A1, and B combined) (Table 1). Bear visitation rates in Zone C (peripheral range) averaged 37%. The visitation rate in Zone C was inflated somewhat because Polk and Shawano Counties were not surveyed this year. Bear visitation rates in those counties have historically been <10% which would have lowered the overall visitation rate in the zone.

The 3-year mean visitation rates in the primary bear range increased rather steadily and significantly from 1985 (32%) to 1997 (55%) and now may have stabilized (1998 = 54%; 1999 = 51%; 2000 = 53%; 2001 = 53%; 2002 = 54%; 2003 = 55% (Fig. 2). Similar calculations in Zone C (excluding Barron and Polk Counties) produced 3-year average visitation rates of 17% in 1998, 21% in 1999, 23% in 2000, 29% in 2001, 32% in 2002, and 36% in 2003. The Bear Bait Station Survey suggested a steady increase in the bear population during the past 5 years.

Teeth were collected from 2,040 of the 2,471 bears harvested in 2002 (Table 2). The age structure of bears harvested has been relatively stable since the initiation of the quota system in 1986. Mean ages of bears harvested have ranged from 3.3 - 4.3 years for males and 4.2 - 5.3 years for females .

The Bear Population Model produced a statewide population estimate of approximately 11,150 bears in Fall, 2003 (Table 3). This included 4,250 bears in Zone A, 3,850 in Zone A1, 1,900 in Zone B, and 1,150 in Zone C. Population trends calculated by the Bear Population model for the primary range closely paralleled those suggested by the Bear Bait Station Surveys (Fig. 2). The current population model for Zone C produced relatively stable population estimates for the past 9 years whereas the Bear Bait Station Surveys have suggested an increase in the population. Population trends generated by these models and the bait station surveys should be periodically compared as a basis for potential recalibration of the models.

In 2002, WS personnel ear-tagged 73 new bears involved in damage/nuisance complaints and 13 bears ear-tagged in previous years. Of these, 84 were adults available for harvest in Wisconsin during the 2002 Black Bear Season and 20 of them were harvested (Table 4). This produced an estimate of approximately 10,000 adult bears statewide in Fall, 2002 as compared to an estimate of 9,000 adults produced by the population model. In all 7 years the confidence intervals around the mark-recapture estimates included the model estimates of the number of adult bears, and in 6 of the 7 years the mark-recapture estimates were within 11% of the model estimates. When averaged across the 7 years, the mark-recapture estimates were about 15% higher than the model estimates. Mark-recapture estimates were not calculated for 2001 because only 25 bears were ear-tagged that year.

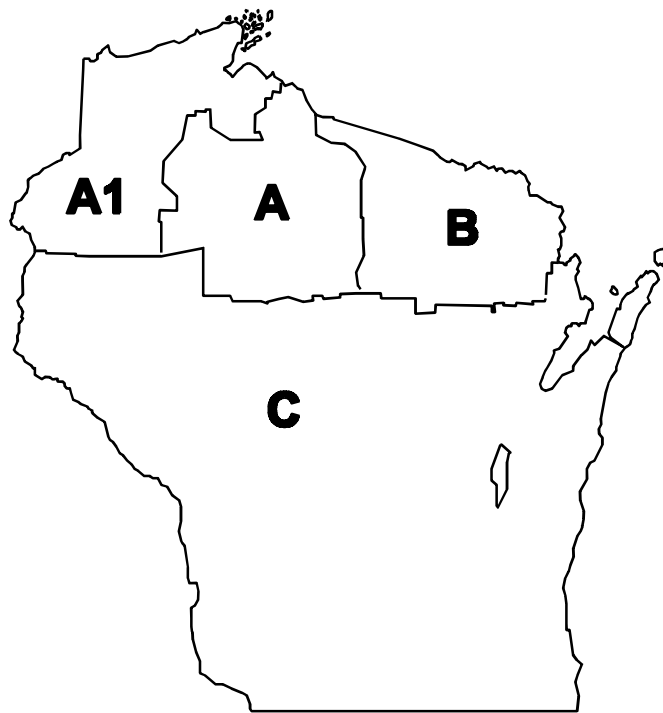
Bear population estimates in Zones A, B, and C are now slightly below goals, whereas the bear population estimate in Zone A1 is approximately 15% above our prescribed goal. The WDNR Bear Advisory Committee recommended a harvest of 2,380 bears for the 2003 season. This included 700 bears in Zone A, 1,000 in Zone A1, 380 in Zone B, and 300 in Zone C.

### **Literature Cited**

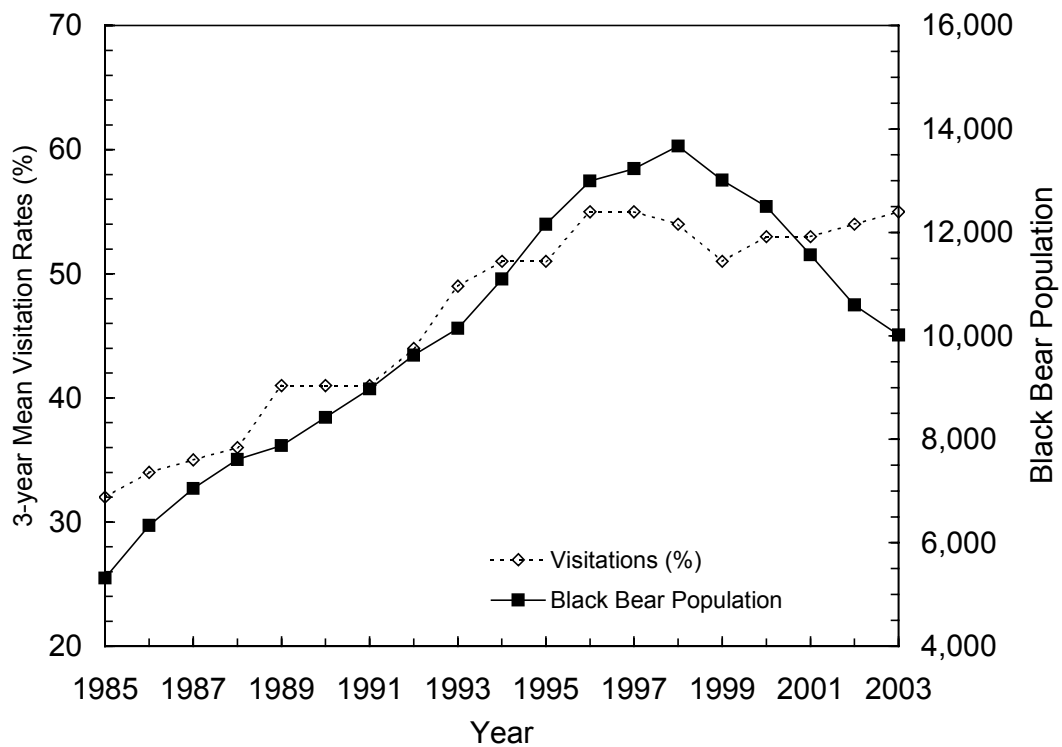
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**Figure 1.** Wisconsin's Black Bear Management Zones, 2003.



**Figure 2.** Bear visitation rates on bait station surveys (3-yr running average) and population estimates calculated by the model for the primary range (Zones A, A1, and B), 1985-2003.

**Table 1.** *Percent of bear bait stations visited by bears, 1992-2003.*

County	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Ashland	62	51	49	68	79	68	48	68	82	63	51	57
Bayfield	47	65	67	77	67	32	83	83	67	64	79	65
Burnett	28	46	29	23	50	39	63	60	71	84	53	36
Douglas	29	49	33	58	41	43	37	62	61	30	33	33
Florence	69	70	56	50	44	38	46	64	54	----	34	53
Forest	21	37	74	59	66	88	26	43	61	55	58	60
Iron	58	61	58	55	69	86	58	48	41	42	47	55
Langlade	33	35	31	49	45	62	29	30	48	44	56	53
Lincoln	32	53	59	72	60	76	52	41	55	33	68	44
Marinette	35	42	30	7	26	19	26	44	35	39	65	24
Oconto	12	--	7	2	12	16	6	18	6	25	47	28
Oneida	22	46	45	12	32	67	23	66	23	36	63	95
Price	43	74	65	64	66	88	43	31	50	50	42	68
Rusk	68	86	74	64	97	85	71	84	84	91	72	58
Sawyer	58	56	73	52	87	93	66	76	68	91	91	79
Taylor	13	22	19	18	48	46	62	52	42	36	50	57
Vilas	53	42	57	53	57	57	36	52	31	34	26	47
Washburn	69	93	72	91	85	84	60	90	91	74	88	85
<b>Primary Range</b>	<b>42</b>	<b>55</b>	<b>49</b>	<b>48</b>	<b>57</b>	<b>60</b>	<b>47</b>	<b>56</b>	<b>51</b>	<b>52</b>	<b>56</b>	<b>54</b>
Barron				--	--	16	26	11	30	28	17	11
Chippewa				30	39	27	15	52	41	20	44	50
Clark				19	22	6	12	33	16	39	54	52
Jackson				6	11	13	27	0	28	11	20	15
Marathon				29	20	32	7	8	13	32	66	69
Menominee				19	14	14	8	5	46	6	11	9
Polk				--	--	2	8	4	9	7	2	---
Shawano				--	0	0	0	0	0	7	0	---
<b>Peripheral Range</b>				<b>21</b>	<b>17</b>	<b>13</b>	<b>13</b>	<b>14</b>	<b>23</b>	<b>19</b>	<b>27</b>	<b>37</b>

**Table 2.** *Age classes of bears harvested in Wisconsin, 1986-2002.*

Year	Sex	Percent in age class			No. aged	Mean age
		1-2 yr	3-9 yr	10+ yr		
1986	Male	59.5	37.2	3.3	210	3.6
	Female	43.8	41.3	9.9	121	4.2
1987	Male	52.6	43.2	4.2	401	4.1
	Female	41.5	52.0	6.5	200	4.6
1988	Male	60.4	35.0	4.6	439	3.7
	Female	40.9	51.9	7.2	345	4.7
1989	Male	53.9	39.0	7.1	397	4.2
	Female	42.5	47.9	9.6	261	5.0
1990	Male	67.0	30.4	2.6	454	3.4
	Female	46.8	48.1	5.1	331	4.6
1991	Male	56.9	37.3	5.8	448	4.0
	Female	38.9	54.9	6.2	306	4.7
1992	Male	63.9	32.1	4.0	474	3.5
	Female	48.4	45.0	6.6	380	4.3
1993	Male	50.9	41.7	7.4	405	4.3
	Female	37.8	57.3	4.9	286	4.6
1994	Male	62.6	31.4	6.0	441	3.9
	Female	50.9	45.0	4.1	271	4.2
1995	Male	55.7	41.4	2.9	600	3.6
	Female	37.7	52.0	10.5	435	5.3
1996	Male	60.0	37.3	2.7	771	3.6
	Female	46.8	45.6	7.6	536	4.7
1997	Male	65.0	32.6	2.5	765	3.5
	Female	47.9	44.2	7.9	620	4.6
1998	Male	65.0	33.4	1.6	1,134	3.3
	Female	49.0	44.2	6.9	904	4.5
1999	Male	67.6	29.9	2.4	1,058	3.3
	Female	51.5	39.3	9.2	954	4.7
2000	Male	68.1	29.0	2.9	1227	3.3
	Female	49.8	41.5	8.7	1,046	4.7
2001	Male	67.8	29.2	3.0	1,250	3.4
	Female	51.2	40.8	8.0	1,023	4.6
2002	Male	59.5	34.6	5.9	1,094	3.9
	Female	44.5	43.7	11.8	946	5.2

**Table 3.** *Modeled bear population estimates by Management Zone, 1988-2003.*

Year	Bear Management Zone				State
	A	A1	B	C	
1988	3,450	2,650	1,500	650	8,250
1989	3,450	2,800	1,600	700	8,550
1990	3,600	3,050	1,750	800	9,200
1991	3,800	3,350	1,800	850	9,800
1992	4,000	3,700	1,900	900	10,500
1993	4,050	4,100	2,000	950	11,100
1994	4,350	4,650	2,100	950	12,050
1995	4,850	5,050	2,250	1,050	13,200
1996	5,450	5,350	2,250	1,050	14,100
1997	5,600	5,400	2,250	1,100	14,350
1998	5,950	5,500	2,250	1,150	14,850
1999	5,600	5,200	2,200	1,150	14,150
2000	5,400	4,950	2,200	1,150	13,700
2001	5,000	4,450	2,100	1,200	12,750
2002	4,450	4,200	2,000	1,100	11,750
2003	4,250	3,850	1,900	1,150	11,150
Goal	4,600	3,300	2,200	1,200	11,300

The 2003 estimates equate to bear densities of 1 bear per 1.3 square miles of bear range in Zone A, 1 per 1.4 square miles in Zone A1, 1 per 2.7 square miles in Zone B, and 1 per 5.1 square miles of occupied range in Zone C.

**Table 4.** *Adult bear population estimates calculated from bears ear-tagged by WS personnel, 1995-2002.*

Year	No. of Tagged Bears	No. of Tagged Bears Shot	Harvest	Adult Population Estimate	± 95% Conf. Int.	Adult Pop. Estimate from Pop. Model
1995	171	28	1,737	10,300	3,300	10,200
1996	180	35	2,325	11,700	3,300	10,900
1997	146	31	2,178	10,000	3,000	11,000
1998	78	13	3,184	18,000	8,200	11,500
1999	95	19	2,881	13,800	5,200	10,900
2000	56	15	3,075	11,000	4,400	10,500
2001*	25	---	2,897	-----	-----	-----
2002	84	20	2,471	10,000	3,600	9,000

\* Population estimate not calculated from ear-tagged bears in 2001 due to small sample size.